ARIZONA MICROTEK, INC.

AZ10E131
AZ100E131

ECL/PECL 4-bit D Flip-Flop

FEATURES

- 1100 MHz Min. Toggle Frequency
- Differential Outputs
- Individual and Common Clocks
- Individual Resets (asynchronous)
- Paired Sets (asynchronous)
- Operating Range of 4.2V to 5.46V
- 75kΩ Internal Input Pulldown Resistors
- Direct Replacement for On Semiconductor MC10E131 & MC100E131

PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
PLCC 28	AZ10E131FN	AZM10E131 <Date Code>	1,2
PLCC 28	AZ100E131FN	AZM100E131 <Date Code>	1,2

1 Add R2 at end of part number for 13 inch (2.5K parts) Tape & Reel.
2 Date code format: "YY" for year followed by "WW" for week.

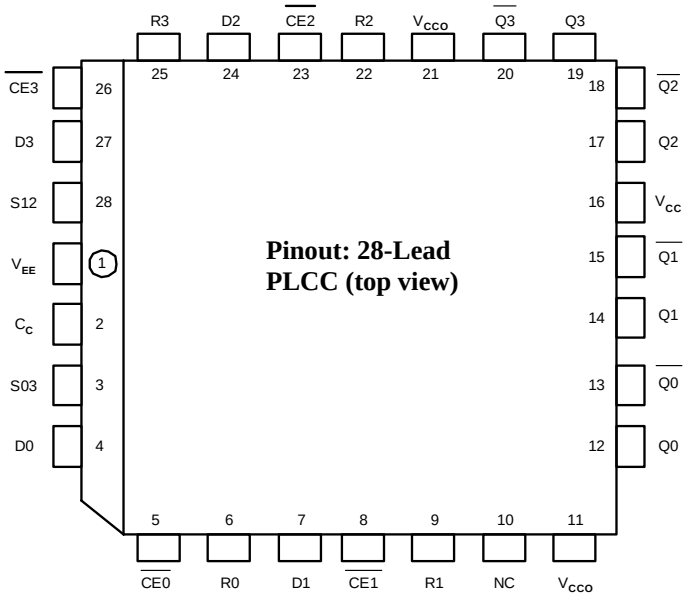
DESCRIPTION

The AZ10/100E131 is a quad master-slave D-type flip-flop with differential outputs. Each flip-flop may be clocked separately by holding Common Clock (C_C) LOW and using the Clock Enable ($\overline{CE}n$) inputs for clocking. Common clocking is achieved by holding the $\overline{CE}n$ inputs LOW and using C_C to clock all four flip-flops. In this case, the $\overline{CE}n$ inputs perform the function of controlling the common clock to each flip-flop.

Individual asynchronous resets are provided (Rn). Asynchronous set controls (Sn) are ganged together in pairs, with the pairing chosen to reflect physical chip symmetry.

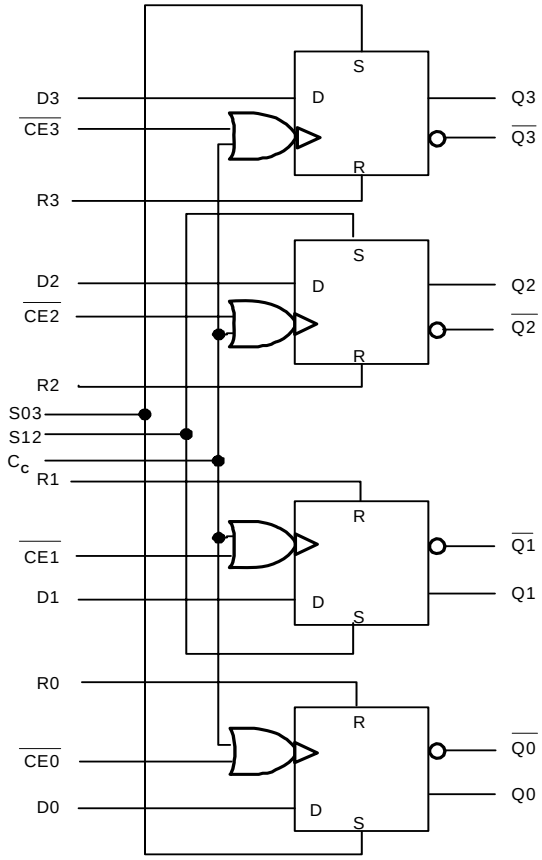
Data enters the master when both C_C and $\overline{CE}n$ are LOW, and transfers to the slave when either C_C or $\overline{CE}n$ (or both) go HIGH.

NOTE: Specifications in ECL/PECL tables are valid when thermal equilibrium is established.



* All V_{CC} and V_{CCO} pins are tied together on the die.

LOGIC SYMBOL



PIN DESCRIPTION

PIN	FUNCTION
D0 – D3	Data inputs
$\overline{CE0}$ – $\overline{CE3}$	Clock Enables (Individual)
R0 – R3	Resets
C_C	Common Clock
S03,S12	Sets (paired)
Q0 – Q3	True Outputs
$\overline{Q0}$ – $\overline{Q3}$	Inverting Outputs
V_{CC} , V_{CCO}	Positive Supply
V_{EE}	Negative Supply
NC	No connect

Absolute Maximum Ratings are those values beyond which device life may be impaired.

Symbol	Characteristic	Rating	Unit
V_{CC}	PECL Power Supply (V_{EE} = 0V)	0 to +8.0	Vdc
V_I	PECL Input Voltage (V_{EE} = 0V)	0 to +6.0	Vdc
V_{EE}	ECL Power Supply (V_{CC} = 0V)	-8.0 to 0	Vdc
V_I	ECL Input Voltage (V_{CC} = 0V)	-6.0 to 0	Vdc
I_{OUT}	Output Current --- Continuous --- Surge	50 100	mA
T_A	Operating Temperature Range	-40 to +85	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C

10K ECL DC Characteristics (V_{EE} = -4.94V to -5.46V, V_{CC} = V_{CCO} = GND)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1]	-1080		-890	-1020		-840	-980		-810	-910		-720	mV
V_{OL}	Output LOW Voltage[1]	-1950		-1650	-1950		-1630	-1950		-1630	-1950		-1595	mV
V_{IH}	Input HIGH Voltage	-1230		-890	-1170		-840	-1130		-810	-1060		-720	mV
V_{IL}	Input LOW Voltage	-1950		-1500	-1950		-1480	-1950		-1480	-1950		-1445	mV
I_{IH}	Input HIGH Current C_C S R, $\overline{CE}$ D			 350 450 300 150			 350 450 300 150			 350 450 300 150			 350 450 300 150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		58	70		58	70		58	70		58	70	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

10K PECL DC Characteristics (V_{EE} = GND, V_{CC} = V_{CCO} = +5.0V)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1,2]	3920		4110	3980		4160	4020		4190	4090		4280	mV
V_{OL}	Output LOW Voltage[1,2]	3050		3350	3050		3370	3050		3370	3050		3405	mV
V_{IH}	Input HIGH Voltage[1]	3770		4110	3830		4160	3870		4190	3940		4280	mV
V_{IL}	Input LOW Voltage[1]	3050		3500	3050		3520	3050		3520	3050		3555	mV
I_{IH}	Input HIGH Current C_C S R, $\overline{CE}$ D			 350 450 300 150			 350 450 300 150			 350 450 300 150			 350 450 300 150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		58	70		58	70		58	70		58	70	mA

1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

100K ECL DC Characteristics (V_{EE} = -4.2V to -5.46V, V_{CC} = V_{CCO} = GND)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1]	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage[1]	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	-1810	-1705	-1620	mV
V_{IH}	Input HIGH Voltage	-1165		-880	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage	-1810		-1475	-1810		-1475	-1810		-1475	-1810		-1475	mV
I_{IH}	Input HIGH Current C_C S R, $\overline{CE}$ D			 350 450 300 150			 350 450 300 150			 350 450 300 150			 350 450 300 150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		58	70		58	70		58	70		67	81	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

100K PECL DC Characteristics (V_{EE} = GND, V_{CC} = V_{CCO} = +5.0V)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1,2]	3915	3995	4120	3975	4045	4120	3975	4045	4120	3975	4045	4120	mV
V_{OL}	Output LOW Voltage[1,2]	3170	3305	3445	3190	3295	3380	3190	3295	3380	3190	3295	3380	mV
V_{IH}	Input HIGH Voltage[1]	3835		4120	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage[1]	3190		3525	3190		3525	3190		3525	3190		3525	mV
I_{IH}	Input HIGH Current C_C S R, $\overline{CE}$ D			 350 450 300 150			 350 450 300 150			 350 450 300 150			 350 450 300 150	µA
I_{IL}	Input LOW Current	0.5			0.5			0.5			0.5			µA
I_{EE}	Power Supply Current		58	70		58	70		58	70		67	81	mA

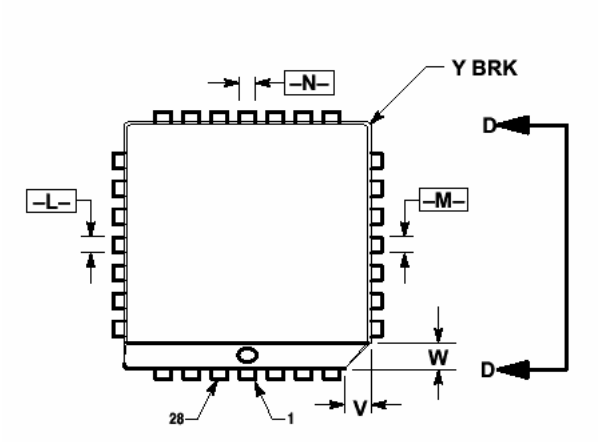
1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

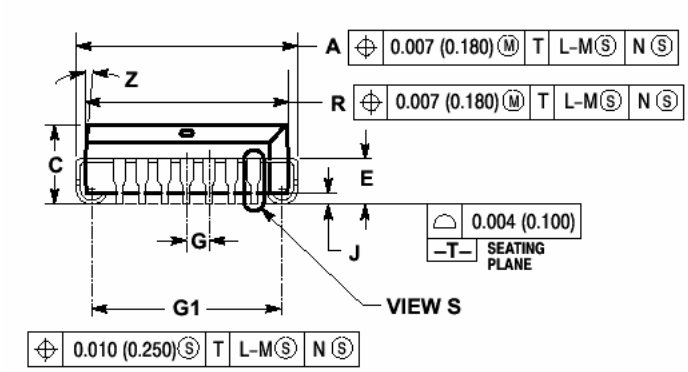
AC Characteristics (V_{EE} = 10E(-4.94V to -5.46V), 100E(-4.2V to -5.46V); V_{CC} = V_{CCO} = GND or V_{EE} = GND, V_{CC} = V_{CCO} = 10E(+4.94V to +5.46V), 100E(+4.2V to +5.46V))

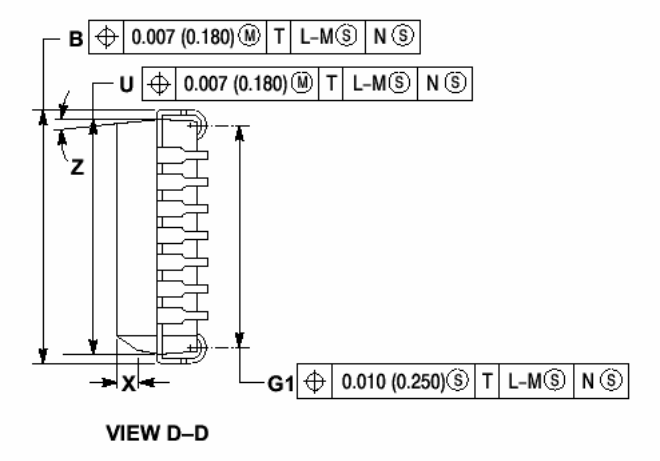
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
F_{max}	Max. Toggle Frequency	1100	1400		1100	1400		1100	1400		1100	1400		MHz
t_{PLH} / t_{PHL}	Propagation Delay to Output													
	$\overline{CE}$	310	600	750	360	500	700	360	500	700	360	500	700	ps
	C_C	275	600	725	325	500	675	325	500	675	325	500	675	
	R	300	620	775	350	550	725	350	550	725	350	550	725	
	S	300	550	775	350	550	725	350	550	725	350	550	725	
t_S	Setup Time[2] D	200	20		150	20		150	20		150	20		ps
t_H	Hold Time[2] D	225	-20		175	-20		175	-20		175	-20		ps
t_{RR}	Reset Recovery Time	450	150		400	150		400	150		400	150		ps
t_{PW}	Minimum Pulse Width CLK, S, R	400			400			400			400			ps
t_{SKEW}	Within-Device Skew[1]		60			60			60			60		ps
t_r / t_f	Rise/Fall Times 20% - 80%	275		725	300		675	300		675	300		675	ps

1. Within-device skew is defined as identical transitions on similar paths through a device.
2. Setup/hold times guaranteed for both C_C & $\overline{CE}$.

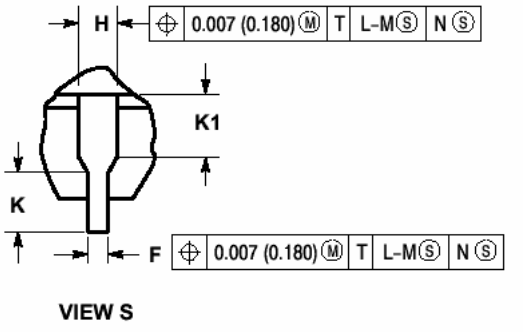
PACKAGE DIAGRAM
PLCC 28







VIEW D–D



VIEW S

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.32	12.57	0.485	0.495
B	12.32	12.57	0.485	0.495
C	4.20	4.57	0.165	0.180
E	2.29	2.79	0.090	0.110
F	0.33	0.48	0.013	0.019
G	1.27 BSC		0.050 BSC	
H	0.66	0.81	0.026	0.032
J	0.51		0.020	
K	0.64		0.025	
R	11.43	11.58	0.450	0.456
U	11.43	11.58	0.450	0.456
V	1.07	1.21	0.042	0.048
W	1.07	1.21	0.042	0.048
X	1.07	1.42	0.042	0.056
T		0.50		0.020
Z	2^O	10^O	2^O	10^O
G1	10.42	10.92	0.410	0.430
K1	1.02		0.040	

NOTES:
1. DATUMS –L-, -M-, AND –N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T-, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALOWABLE MOLD FLASH IS 0.010mm (0.250in.) PER SIDE.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.
6. THE PACKAGE TOP MAY BE SMALLER THAN THE PACKGE BOTTOM BY UP TO 0.012mm (0.300in.). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, THE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025mm (0.635in.).